

REMARKS

Reconsideration of this application is respectfully requested.

Claims 1, 5, 6 and 55 are in the application. Through this Amendment, claim 1 has been amended and new claims 56-57 have been added. Claim 1 has been amended to recite that the ligand has been dissolved in an alkaline solvent. Support for this amendment may be found, for example, at paragraphs [0046] and [0075] of the application as filed. New claims 56-57 specifically recite that the alkaline solvent is NaOH and 0.1 M NaOH, respectively. Support for these amendments may be found, for example, at paragraph [0075] of the application as filed. No new matter is introduced through this amendment.

In the Official Action, the Examiner rejected claims 1, 5, 6 and 55 under 35 U.S.C. §103(a) as being allegedly unpatentable over Grahnen et al. (Eur. J. Biochem., 80, 573-580 (1997)) in view of Spring et al. (U.S. Patent No. 5,643,721) further in view of Degen et al. (U.S. Patent No. 5,567,615). The Examiner admitted that "Grahnen et al. fail to teach the ligand attached to the support via an epoxy linkage." To overcome this deficiency, the Examiner asserted that Spring et al. teach ligands may be attached to an agarose substrate. Further, the Examiner asserted that Degen et al. teach a ligand having a hydroxyl group attached to a polymer support via an epoxy linker, and therefore asserted that Degen et al. teach attachment of a ligand that is epoxy activated (referring to Col. 13, lines 44-46) in order to provide attachment of ligands. The Examiner asserted that Grahnen et al. do not teach away from using epoxy linkages, and further asserted that binding characteristics of BSP are not relevant to the epoxy linkage.

The claims of the present application have been amended. In particular, the claims have been amended to recite that the ligand, which is to be bound to the insoluble support via an epoxy linkage, has been dissolved in an alkaline solvent. New claims 56 and 57 recite that the alkaline solvent is NaOH and 0.1 M NaOH, respectively.

The Examiner acknowledged that Grahnen et al. fail to disclose epoxy linkages, instead relying on Degen et al. and Spring et al. to arrive at this limitation. However, neither Degen et al. nor Spring et al. disclose or suggest that the ligand has been dissolved in an alkaline solvent. In fact, Degen et al. recite exactly the opposite – that the ligand is to be dissolved in an acidic solution. While it is true that Degen et al. disclose that epoxy-activated polymer substrates may be used, in using such a substrate, Degen et al. specifically state that “activation of amine and carboxyl containing polymer matrices is effected by treatment with purified ligands dissolved in slightly acidic (pH = 4.5-6.5) buffer solutions.” (Col. 13, lines 51-54). Spring et al. fail to disclose dissolving the ligand in any solution to form an epoxy bond (See Col. 8, line 35 – Col. 9, line 22).

The epoxy-activated support recited in the present claims clearly is a carboxyl containing polymer matrix (since it contains an epoxy group). Even further, agarose (as set forth in dependent claims) is a carboxyl-containing compound. Since the support is a carboxyl-containing compound, a reading of Degen et al. demonstrates that the ligand is to be dissolved in an acidic solution. One of ordinary skill in the art reading Degen et al. would not be led to using a ligand that has been dissolved in an alkaline solution. In fact, one of ordinary skill in the art would understand that dissolving a ligand in an alkaline solution would be ineffective in activating the polymer matrix.

New claims 56 and 57 further define the alkaline solvent as including NaOH and 0.1 M NaOH, respectively. None of the references discloses dissolving a ligand in either of these solvents.

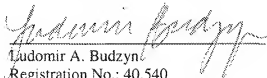
Grahnen et al. and Spring et al. fail to disclose formation of an epoxy linkage between an epoxy activated insoluble support and a ligand, where the ligand has been dissolved in an alkaline solution. Degen et al. fail to remedy this defect, since it discloses that the ligand is to be dissolved in an acidic solution. One of ordinary skill in the art would not be led to dissolve the ligand in an alkaline solution, since it would clearly be contrary to the express teachings of

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Degen et al. Thus, the claims as currently pending are allowable over Grahnen et al., Spring et al. and Degen et al., whether taken alone or in combination.

Favorable action is earnestly solicited. If there are any questions or if additional information is required, the Examiner is respectfully requested to contact Applicant's attorney at the number listed below.

Respectfully submitted,


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